CLAIMS

1. A photon number state generating apparatus comprising:

a photon pair source for generating a pair of photons consisting of a signal photon and an idler photon which are corrected in time of generation each other;

a photon number detector for detecting a number of the idler photons;

a gate device for controlling an emission of the signal photons;

a controller for controlling the gate device in response to a photon number information from the photon number detector.

2. The photon number state generating apparatus of claim 1, wherein said photon pair source comprises:

a pumping light source;

a nonlinear optical medium on which a pumping light from the pumping light source is incident.

3. The photon number state generating apparatus of claim 2 comprising:

a nonlinear optical crystal in which an angle between the pumping light and an optical axis of the nonlinear optical medium is set to an angle at which tuning curves come in contact with a straight line corresponding to a single specific wavelength a.

4. The photon number state generating apparatus of claim 2 comprising:

a nonlinear optical crystal in which an angle between the pumping light and an optical axis of the nonlinear optical medium is set to an angle at which tuning curves come in contact with two straight lines corresponding to two specific wavelength a and b.

5. The photon number state generating apparatus of claim 2, wherein said nonlinear optical medium on which the pumping light is incident comprises a waveguide channel type nonlinear optical medium.

6. The photon number state generating apparatus of claim 2, wherein the nonlinear optical medium on which the pumping light is incident comprises a pseudophase matching type nonlinear optical medium.

7. The photon number state generating apparatus of claim 1 comprising:

a pulse height discriminator equipped in the controller for discriminating a photon number information having photon number within a specified range, wherein the controller controls the gate device in response to the photon number information from the photon number detector.

8. The photon number state generating apparatus of claim 1 comprising:

a photon number detector in which an output pulse height

changes in response to the number of incident photons;

a pulse height discriminator equipped in the controller for discriminating output pulse of photon number detector having a pulse height of a specified range.

9. The photon number state generating apparatus of claim 1 comprising:

a discriminator for discriminating a case in which a number of photon incident on the photon number detector in one.

10. The photon number state generating apparatus of claim 1 comprising:

a pulse height discriminator for discriminating a case in which an output pulse height of the photon number detector corresponding to a number of incident photon that is one.

11. The photon number state generating apparatus of claim 7, wherein said controller comprises:

a clock generator;

a gate operation frequency judging section for controlling the gate device to be opened or closed for less than a specified number of times within a predetermined time defined by clock signal of the clock generator.

12. The photon number state generating apparatus of claim 7, wherein said controller comprises:

a clock generator;

a gate operation frequency judging section for controlling the gate to be opened or closed only for a first signal of the photon number detector within a predetermined time defined by clock signal of the clock generator.

13. The photon number state generating apparatus of claim 1, wherein said gate device for controlling an emission of the signal photon comprises a plurality of shutters which open or close in a time difference shorter than a open or close time of the shutters.

14. The photon number state generating apparatus of claim 1 further comprising:

an optical fiber for allowing the idler photon to reach the gate device for controlling an emission of the photon.